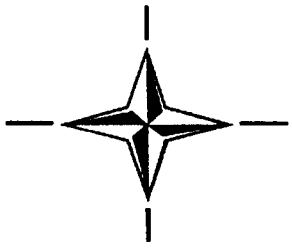
STANAG 4338
(Edition 1)

NORTH ATLANTIC TREATY ORGANIZATION
(NATO)



MILITARY AGENCY FOR STANDARDIZATION
(MAS)

STANDARDIZATION AGREEMENT
(STANAG)

SUBJECT: UNDERWATER-LAUNCHED MUNITIONS, SAFETY EVALUATION

Promulgated on 17 March 1998

A. GRØNHEIM
Major General, NOAF
Chairman, MAS

STANAG 4338
(Edition 1)

RECORD OF AMENDMENTS

No.	Reference/date of amendment	Date entered	Signature

EXPLANATORY NOTES

AGREEMENT

1. This NATO Standardization Agreement (STANAG) is promulgated by the Chairman MAS under the authority vested in him by the NATO Military Committee.

2. No departure may be made from the agreement without consultation with the tasking authority. Nations may propose changes at any time to the tasking authority where they will be processed in the same manner as the original agreement.

3. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

DEFINITIONS

4. Ratification is "In NATO Standardisation, the fulfillment by which a member nation formally accepts, with or without reservation, the content of a Standardization Agreement" (AAP-6).

5. Implementation is "In NATO Standardisation, the fulfillment by a member nation of its obligations as specified in a Standardization Agreement" (AAP-6).

6. Reservation is "In NATO Standardization, the stated qualification by a member nation that describes the part of a Standardization Agreement that it will not implement or will implement only with limitations" (AAP-6).

RATIFICATION, IMPLEMENTATION AND RESERVATIONS

7. Page iii gives the details of ratification and implementation of this agreement. If no details are shown it signifies that the nation has not yet notified the tasking authority of its intentions. Page (iv) (and subsequent) gives details of reservations and proprietary rights that have been stated.

RATIFICATION AND IMPLEMENTATION DETAILS
STADE DE RATIFICATION ET DE MISE EN APPLICATION

NATION	NATIONAL RATIFICATION REFERENCE DE LA RATIFICATION NATIONALE	NATIONAL IMPLEMENTING DOCUMENT NATIONAL DE MISE EN APPLICATION	IMPLEMENTATION/MISE EN APPLICATION					
			FORECAST DATE PREVUE			ACTUAL DATE REELLE		
			NAVY MER	ARMY TERRE	AIR	NAVY MER	ARMY TERRE	AIR
BE								
CA	2441-4338 (DACME2) of/du 8.5.95	STANAG 4338				1.95	1.95	1.95
DA								
FR								
GE	BMVg-Fü SIV 2-Az03-51-30 of/du 16.10.95					5.98	5.98	5.98
GR								
IT								
LU	BO 143/95 of/du 25.1.95						N.I.	
NL	M95004333 of/du 1.3.95	STANAG 4338				2.98		
NO	MAS-277/95/HST/U3/BØ/STANAG 4338 of/du 7.4.95					1.98		
PO	RRN 089/96/DA of/du 3.5.96	STANAG 4338				1.98		
SP								
TU	TUDEL-97/260 of/du 20.1.97					6.96		
UK	D/DSTAN/341/8/4338 of/du 18/1/95	STANAG 4338				2.98	2.98	2.98
US	OUSD(A&T)S&TS/M of/du 20.6.96	STANAG 4338				6.96	6.96	6.96

See overleaf reservations(*)/comments (+)
Voir au verso réserves (*)/commentaires (+)

RESERVES/RESERVATIONS

NATO UNCLASSIFIED

NORTH ATLANTIC TREATY ORGANIZATION
ORGANISATION DU TRAITE DE L'ATLANTIQUE NORD

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17 March 1998 MAS/117-PPS/4338

See Distribution List N° 2

STANAG 4338 PPS (EDITION 1) - UNDERWATER-LAUNCHED MUNITIONS, SAFETY EVALUATION

Reference:
AC/310-D/126 dated 28 November 1994 (Edition 1)(1st Draft)

1. The enclosed NATO Standardization Agreement which has been ratified by nations as reflected in page iii is promulgated herewith.

2. The reference listed above is to be destroyed in accordance with local document destruction procedures.

3. AAP-4 should be amended to reflect the latest status of the STANAG (and AP if applicable).

ACTION BY NATIONAL STAFFS

4. National staffs are requested to examine page iii of the STANAG and, if they have not already done so, advise the Defense Support Division, IS, through their national delegation as appropriate of their intention regarding its ratification and implementation.

A. GRØNHEIM
Major General, NOAF
Chairman MAS

Enclosure:
STANAG 4338 (Edition 1)

664mv/117(98)

STANAG 4338
(Edition 1)

NAVY/ARMY/AIR

NATO STANDARDIZATION AGREEMENT (STANAG)

UNDERWATER-LAUNCHED MUNITIONS, SAFETY EVALUATION

Related Documents:

STANAG 2895	Extreme Climatic Conditions and Derived Conditions for Use in Defining Design/Test Criteria for NATO Forces Materiel
STANAG 4170	Principles and Methodology for the Qualification of Explosive Materials for Military Use
STANAG 4187	Fuzing System - Safety Design Requirements
STANAG 4234	Electromagnetic Radiation (Radio Frequency) 200 kHz to 40 GHz Environment - Affecting the Design of Materiel for Use by NATO Forces
STANAG 4235	Electrostatic Environmental Conditions Affecting the Design of Materiel for Use by NATO Forces
STANAG 4240	Liquid Fuel Fire Tests for Munitions
STANAG 4241	Bullet Attack Test for Munitions
STANAG 4333	Underwater Munitions, Principles for Safe Design
AAP-6	NATO Glossary of Terms and Definitions
AOP-15	Guidance on the Assessment of the Safety and Suitability for Service of Munitions for NATO Armed Forces
AECP-1	Mechanical Environmental Conditions to which Materiel Intended for Use by NATO Forces could be exposed

AIM

1. The aim of this agreement is to standardize the process of evaluating the safety of underwater-launched munitions (ULMs) and their explosive components to support the appraisal of their suitability for service, This STANAG also fulfills the requirement of AOP-15, section 8 for establishing safety related test criteria for the underwater-launched class of munitions.

AGREEMENT

2. Participating nations agree to comply with the requirements of this STANAG and with applicable related documents listed in this STANAG in assessing the safety and suitability for service of munitions covered by this document. Notwithstanding the intention to avoid duplication of testing, each nation reserves the right to carry out additional tests or analyses if considered necessary, and, when necessary, to bear the financial costs of so doing.

DEFINITIONS

3. For the purposes of this document, an underwater-launched munition is defined as any non-nuclear munition that is ejected, propelled, released, placed or otherwise launched in an underwater environment. The term "munition" is defined in AOP-15, other specific terms are defined in AAP-6 and in the related documents listed above.

GENERAL

4. Safety and suitability for service of any munition are judgments made by appropriate authorities based on a knowledge of the munition's design, use, service environment and results of analyses and tests. As discussed in AOP-15, the process of assessing the safety and suitability for service of a munition includes:

a. comparing the design of the munition with accepted safety design guidelines;

b. analyzing the munition for hazards associated with its design and use; and

c. testing the munition to characterize its response to anticipated service environments.

4.1 The safety and suitability for service of a ULM is to be determined by assessing the degree to which the design of the ULM complies with accepted principles for the safe design of ULMs such as those stated in STANAG 4333. Then, using recognized system safety analysis processes to examine hazards associated with the design and use of the ULM, the degree to which those hazards are expected to be eliminated or controlled is to be evaluated. Finally, the degree to which results of developmental, performance and system hazard assessment tests confirm that the safety design features of the munition are effective and that identified hazards are eliminated or controlled is to be assessed.

4.2 Assessment. Unless specified in the STANAG or national test procedure applied for a given test, no pass/fail criteria are established for the tests discussed below. Assessment of the safety and suitability for service of the ULM shall be a judgment that the ordnance safety authority of the developing nation makes based upon consideration of the results of all analyses and testing. In making the assessment, the results of developmental testing, testing of subassemblies of the ULM and tests performed for reasons other than safety, such as for obtaining performance and reliability data, shall be considered.

4.3 Responsibilities. While the developing nation has the primary responsibility for evaluating the safety of a ULM, a user nation may have other needs that would require additional effort.

4.3.1 Developing Nation Responsibilities. The developing nation shall compile a data package that documents its assessment of the safety and suitability for service of the ULM. That data package shall contain, as a minimum, the test plan, rationale for the selection of tests, test parameters, sequences, and system configurations used in each test. The data package shall contain the results of all safety evaluation analyses, detailed test descriptions, results of all tests conducted for purposes of safety evaluation, and certification by the national safety authority that the ULM is suitably safe for service use.

4.3.2 User Nation Responsibilities. Each user nation is responsible for assessing the safety and suitability for service of the ULM to be used by its own services. The user nation is responsible for requesting the data package compiled by the developing nation, for determining the need for additional safety and suitability for service tests and for seeking concurrence of its own ordnance safety authority that the ULM is acceptable for service use.

DETAILS OF THE AGREEMENT

5. Participating nations shall include safety-related tests as integral parts of overall test plans established to demonstrate and evaluate characteristics of a ULM under development. (A "safety-related" test is one that is done for the purpose of gaining information about the adequacy or effectiveness of a feature or function that has been included in a munition system to control an identified hazard.) While safety-related tests may be prescribed for one or more of the purposes listed below, the results of all tests, whether designated as safety-related or otherwise, must be made available to the nation's ordnance safety authority for consideration in assessing safety and suitability for service use.

5.1 Appropriate bases for prescribing safety-related tests are:

a. to demonstrate that the design safety features included in the munition will be effective and reliable under all logistic and environmental exposures identified for the munition;

b. to confirm the safety and suitability for service of all energetic components, other hazardous materials or hazardous by-products (e.g., propulsion by-products and toxic materials associated with ULMs aboard submarines) in the specific munition configuration in all expected and unexpected-but-credible environments that may be encountered during the life cycle of the ULM;

c. to examine the consequences of exposure of the ULM to simulated or accelerated life cycle environmental conditions representative of the manufacture-to-target sequence; such conditioning shall include extreme but credible conditions. Specifically, such tests should demonstrate that life cycle environments will not cause unacceptable sensitization of energetic materials, will not induce reactions between energetic materials and other materials in the munition or its packaging, and will not cause the formation or deposition of unacceptably sensitive products beyond the shutter or barrier of an out-of-line fuzing system.

d. to develop evidence that the probable response of the munition to combat induced and credible accident stimuli will not exceed an agreed level of violence that would expose personnel or equipment to unacceptable risk of injury or damage.

5.2 Before test plans that contain safety-related tests are established, the service environment anticipated for the ULM shall be defined and documented and shall be used in the preparation of the test plans to provide rationale for the selection of test parameters for safety-related tests.

5.3 Service Environment. In establishing test criteria to assess the safety and suitability for service of a ULM, the developing nation shall analyze and document the service environment anticipated for the ULM being developed. An analysis method such as that given in AOP-15 can be used for determining the service environment. The analysis shall consider all environments, environmental levels and sequences of environments to which the ULM may be exposed throughout its life cycle. As a minimum, the developing nation shall consider the following environments when determining the ULM's service environment:

a. Natural environments created without human intervention (e.g., temperature, pressure, humidity).

b. Induced environments resulting from the handling and transporting of the ULM from manufacture, through storage and maintenance up to and including loading onto the launch platform.

c. Induced environments resulting from carriage on the launch platform, from operations on the launch platform, and from launch of the ULM.

d. Induced electromagnetic, electrostatic, chemical and nuclear environments resulting from human intervention.

e. Hazardous environments resulting from accidents, unexpected-but-credible environments or enemy actions (e.g., fire, drop, strike by enemy ordnance, transportation accidents).

f. The environment encountered when the munition is required to be disposed of (i) at the termination of service life, (ii) following a credible accident,(iii) as the result of combat induced damage, or (iv) any other circumstance in which EOD procedures are to be implemented.

5.4 This service environment analysis shall consider all configurations of the ULM (assembled, disassembled, in and out of its shipping and handling container) anticipated during the manufacture-to-target sequence. The ordnance safety authority of the developing nation shall document that the service environment has been acceptably defined for the ULM and shall direct the use of the documented service environment in developing test plans for assessing the safety and suitability for service of the ULM.

5.5 Test Plans. The developing nation shall prepare plans that identify tests and test sequences that will be used for evaluating the safety and suitability for service of the ULM. Wherever possible, those plans shall conform to and use internationally accepted test procedures promulgated in STANAGs. In cases where a STANAG has not been promulgated for a test, national test procedures shall be used. The tests and test sequences proposed in the plans shall simulate the most stringent manufacture-to-target environmental exposure and shall include cumulative degradation of the test item as appropriate. Test plans shall also include tests identified through safety analyses performed on the munition. The ordnance safety authority of the developing nation shall document its agreement with the test plans.

5.6 Required Tests. The ULM shall be subjected to the tests listed below. No test listed below shall be excluded from the test program unless the ordnance safety authority of the developing nation agrees that it is not credible that the ULM will ever be subjected to the environment or stimulus being simulated or that the results of conducting the test can be reliably predicted. Exclusion of any of the tests shall be documented and the reason for exclusion given. On the other hand, the list of tests below is not exhaustive, Therefore, if the ULM will be subjected to environments or stimuli not listed, then appropriate tests shall be added to the test plan to determine the response of the ULM to those environments or stimuli.

a. Hazard Assessment Tests. The following hazard assessment tests shall be performed to characterize the munition's response to severe and unexpected-but-credible environments:

Liquid fuel fire (fast cook-off)
Slow heating (slow cook-off)
12 meter drop
Shipboard shock
Bullet impact
Fragment impact
Sympathetic detonation
Out-of-line initiation

b. Environmental Tests Environmental tests simulate exposure to the normal environments expected for the ULM during its life cycle. These tests may or may not be conducted under the auspices of the safety authority, but specific test parameters and results of such tests shall be considered when evaluating the safety of the ULM.

Temperature storage
Thermal shock
Temperature and humidity cycling
Transportation vibration

Launch platform vibration.
Operating vibration
Handling shock
5 foot drop
Jolt
Launch shock
Countermine shock
Electromagnetic radiation (EMR)
Electrostatic discharge (ESD) (human borne and helicopter)
Lightning
Salt spray/fog
Sand/dust

c. Explosive Qualification Tests. The characteristics of the explosives used in ULM systems shall be established in accordance with STANAG 4170 and national requirements, where these national requirements are more stringent.

5.7 Demonstration of Safety-Critical Performance Features. The developing nation shall prescribe and conduct realistic system operational tests that demonstrate the proper functioning and safety effectiveness of all safety-critical performance features of the ULM. Examples of safety-critical performance features are safe jettison, safe escape, safe separation and sterilization features.

5.8 Test Levels. For the environmental tests listed in paragraph 5.6(b) above, the developing nation shall use the maximum credible environmental levels and test durations to which the ULM may be exposed.

IMPLEMENTATION OF THE AGREEMENT

6. This STANAG is implemented when a nation has issued instructions that all future underwater-launched munitions procured for its forces will be evaluated for safety and suitability for service in accordance with procedures detailed in this agreement.